

A VARIABLE DRAG PROJECTILE STABILIZER FOR LIMITING THE FLIGHT RANGE OF A TRAINING PROJECTILE

Abstract

A variable drag projectile stabilizer is utilized by a training projectile to match the trajectory of a tactical projectile for up to 3 km while having a range limitation of 8 km. The stabilizer applies supersonic flow phenomena to alter the aerodynamic characteristics of a training projectile while in free flight to fulfill this requirement. The stabilizer uses a cowling supported by struts to provide tail lift and ensure a stable flight path. Supersonic flow is established through ducts formed by the cowling and struts when launched from a weapon. The flow remains supersonic until the projectile reaches the desired range but then quickly becomes subsonic (choked) due to shock waves emanating from interior angles in the ducts. The geometry of the ducts can be designed to create different shock wave patterns within the ducts. The variance of leading edge location, leading edge angle, cowling intake angle, and flight Mach number influences the shock patterns within the ducts and consequently, the range of the projectile.